

retained feces, and observes that when they occur in the descending colon or sigmoid flexure they are divided into scybala, thus showing that in his vast experience he had probably never met with a case similar to those here recorded. He later mentions a very important sign in the differential diagnosis of these tumours—that is, that they are affected by pressure, yielding to the finger the sensation of a mass of dough or putty. In Case 2 this sign placed the diagnosis beyond a doubt, but it was inapplicable to Case 1 because no tumour could in this instance be felt.

It is noteworthy that in both cases the site of the tumour was the same—in the last portion of the sigmoid flexure, in a position where the external agency of the abdominal muscles is of little avail in the act of defecation. The impaction of faecal masses in this region tends to produce dilatation behind it, and this distension may be localised or general. General dilatations are relatively common.

While the condition of the first case could only be accurately diagnosed at the time of the operation the great mobility of the tumour which subsequently developed itself in the second case gave rise to the belief that in this instance also would a “pedunculated” tumour be met with, for on various occasions it could be demonstrated bimanually that the lesser cavity of the pelvis was absolutely free, the tumour itself being felt well above the pelvis.

The second case illustrates also the inadvisability of the employment of Schleich's infiltration anæsthesia in any case where it is of prime importance that the eliminative functions of the bowels should be in a state of activity. The meteorism produced by the morphine in the injection caused great distress to the patient until it was relieved by the enemata and I shall certainly never employ it again in any laparotomy, where as a rule the master-key to success in after-treatment is so often found in a thorough movement and disinfection of the bowels.

My best thanks are due to Dr. Masi of Buenos Ayres for permission to report his case and for much valuable advice. At the present date (Nov. 10th, 1897) both patients are enjoying good health and are free from constipation.

Buenos Ayres.

FRACTURES OF THE INFERIOR MAXILLÆ TREATED BY A MODIFIED METHOD OF WIRE SUTURE AIDED BY THE ELECTRO-MOTOR.¹

By T. S. CARTER, L.D.S. R.C.S. ENG.,

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BEFORE describing wire-suturing it will be better for me to review briefly the whole subject of fractures of the inferior maxillæ and the treatment which has hitherto been usually adopted, in order that you may draw a comparison between what I trust I may call the old method and the new.

[Mr. Carter here referred to the frequency of fractures of the inferior maxilla and gave an account of their general features.]

Diagnosis.—The symptoms attending a fracture are, as a rule, clearly indicated. There are mobility, crepitus, and very often displacement, the teeth showing differences in level. Those adjacent to the fracture may have been loosened or knocked out and there will be pain and a good deal of salivation. Also the position of the patient is generally indicative as he will be found carefully nursing his jaw with one or both hands. If, however, there be any doubt it is well to grasp the jaw with both hands with the forefingers introduced into the mouth and crepitus between the fragments will be found and movement observable. Where the diagnosis is difficult, as in cases of fracture of the coronoid or condyloid process, it is well to push the index finger of the right hand well back into the mouth and by feeling at the same time externally with the left hand the fracture, if there be one, will be felt. A displaced fragment can often be pushed into its normal position in this way and retained by forcing the jaw upwards against the superior maxilla.

Treatment.—With reference to treatment of fractures, we may note that in early times if the patient got off with a

united fracture and his life, no matter if the articulation was good, bad, or indifferent, he was thankful—a quiet thankfulness like that of the old woman who had only one tooth in each jaw and they were fortunately both on the same side. She said she had not had many blessings in this life, but she did thank God these two teeth touched each other. If in bygone days it was found that teeth by being out of position made the displacement more noticeable, the surgeon by means of forceps soon altered that state of things. The conditions which most favour a satisfactory result in these cases are as follows. The fractured ends of the bone should be firmly maintained in correct apposition after reduction of the displacement. The splint should not interfere with speech or movement of the jaw, or with a proper cleansing of the mouth. Also it is of all things important that we should be able to note throughout the treatment that the grinding surfaces of the teeth of one or both fragments oppose those of the other jaw. This should be the chief aim of the operator, as by its neglect a patient's future health may be imperilled owing to the loss of half his masticating power, and also his personal appearance may be considerably damaged.

It is not necessary for me more than to name some of the forms of splints most frequently used as they are all well described in surgical and dental works. They consist of the four-tailed bandage, and, amongst others, those called after the originators—viz., Kingsley's, Hern's, Gunning's, and Hammond's. Of all interdental splints I think, in cases where there are plenty of firm teeth standing, the latter is most useful on account of its simplicity. It has the advantage of allowing the mouth to be thoroughly cleansed and does not interfere with a full view of the fracture being obtained, nor does it interfere with free movement of the jaw. Samples of the splints I have named are before you, but they are but few of the many which have been devised. This shows the necessity for some simple universal method free from the one great objection—namely, that of having to make a special splint for each case. This is a tedious business, and when carried out you have in most cases filled the patient's mouth with a bulky mass interfering with speech, with proper cleansing of the oral cavity, have difficulty in observing the relative position of parts, and have succeeded in producing salivation and general discomfort to the patient. I therefore took up wire-suturing of the jaws, somewhat on the lines suggested by Dr. Buck of New York in 1847 and later, in 1863, by Mr. Hugh Thomas of Liverpool. The method adopted by the latter was to drill holes, one on either side of the fracture, and having passed his wire to coil it by twisting on a steel rod. I noted, however, in the record of his cases that he stated that the coils made had to be tightened every two or three days. This I take to be due to the coils rather untwisting. Instead of this method I bring the ends of the wire together and twist them and this brings and firmly binds the fractured ends of the bone equally in contact on both buccal and lingual surfaces. The twisted ends of the wire when bent flat, take up less room than the coils, which is an advantage. I notice in two of the cases recorded by Mr. Thomas and one by Mr. Rushton Parker of Liverpool that in order to get at the jaw beyond the angle of the mouth they drilled through the cheek and drew the wire into the mouth. If, however, a retractor be used, this plan is quite unnecessary.

When I first read the notes of these cases I was struck by the fact that to bore the holes by means of a gimlet or Archimedean drill was primitive. When therefore Mr. T. R. Jessop gave me my first jaw case, which was one of Syme's operation for removal of the tongue, followed by non-union at the symphysis, I determined to use the dental engine. With this object I had several long drills made with different-shaped cutting edges, and I found the bayonet shape the best. This was made to fit a dental engine and I had a thicker driving cord added and blocks of lead fixed to the fly-wheel to add to its power. Armed with this I approached the patient and drilled two holes through his jaw as readily as boring through chalk. I was pleased with the result at the time and with the success which followed in many cases afterwards. As, however, the use of the foot for treadle work is a trained movement not practised by surgeons I consulted Mr. S. W. Cuttriss, electrician, and induced him to bring out an electro-surgical motor primarily for the object of drilling any bone in the body, the removal of exostoses, and general aural work, and by degrees to develop it until it could be used for trephining and any form of bone-work. The motor is before you and is on the lines of

¹ A paper read before the British Dental Association at their annual meeting held at Leeds on June 2nd, 1900.

those made by Messrs. Cuttriss and Wallis for dental purposes, only more powerful. It may be constructed to work with either continuous or alternating current as required.

[Mr. Carter here gave an account of various points in the mechanism.]

To facilitate wire suturing I have devised a case containing in small compass all my instruments for suturing fractures, whether of maxillæ, patellæ, or long bones. It was described and illustrated in THE LANCET of August 27th, 1898, p. 558. My method of procedure in a jaw case is as follows. Having taken the necessary antiseptic precautions I take a piece of silver-plated copper wire No. 19 B. W. G. and for the distance of nearly an inch from the end file away half its thickness. To make it more ductile I then pass the wire slowly through the flame of a spirit lamp, making it a dull red for a length of about six inches. With the patient under ether I draw down the lip and with a sterilised bayonet-shaped drill in the motor bore a hole slowly through the jaw posterior to the fracture and between the fangs of the teeth. In this position the inferior dental nerve is avoided, and the opening should be made not less than a quarter of an inch from the fracture. While drilling with the right hand the spoon is held on the lingual side so as to guard the tongue from the point of the drill as it emerges from the foramen. Having withdrawn the drill the plated wire is pushed through from without and by means of forceps drawn well into the mouth. The difficulty has been in returning the silver wire, as it is not easy to find the return passage by simply probing for it. Having, however, drilled the hole on the other side of the fracture a pliable copper needle may be pushed through from without and bent at a suitable angle to allow of being readily threaded with the plated suture wire. Where the point of the wire has been filed it may be bent so as to form a hook, and if the needle is then withdrawn the wire will follow. It is well to drill the hole in the depressed portion of bone on a lower level than the other one, so that there may be a lifting tendency and greater resistance to a relapse in position. I make sure that there is no foreign body, such as a loose fang, between the broken ends of the bone and then lift the displaced portion into position, apply the key, and then twist the wires until the ends of the bone are drawn tightly together. To prevent the key from cutting the wire it is necessary not to push it nearer the bone than, say, half or three-quarters of an inch before the first turn is given. Having severed the twisted wire with side-cutters an end is left projecting about half an inch long. To prevent this from cutting the cheek I cover it with a short piece of indiarubber tubing of the calibre of a crow's quill and turn it down flat. It is well not to drill quickly, as I think the interesting little sequestrum which I will pass round will prove. I found it slung like a bead on the suture wire on the tongue side, as shown in the model of the mouth taken at the time. The hole through the centre was made by the drill and the necrosis was probably due to heat produced by the speed of the revolving engine-point; it is well, therefore, to observe caution in this respect, and also not to advance the drill too rapidly through the bone tissue.

Fractures of the ramus are uncommon, and when they do occur there is little displacement. For cases at the angle, however, where there may be some difficulty I am going to have a right-angle piece made to carry a drill of only just sufficient length to go through the thickness of the ramus and its coverings from the lingual side. In using it so far back it will be necessary to avoid the inferior dental nerve and to have the tongue drawn forward to prevent it from being pushed backwards over the glottis by the angle-piece. Where it is necessary to divide the lower maxilla, as in Syme's operation for removal of the tongue, it is advisable that the surgeon should make, not simply a vertical incision, but two oblique ones from above and below, meeting at an angle, so that the fragments may lock into each other and facilitate retention by wire suture in normal position. Until quite recently I used the dental engine for drilling purposes and I will briefly record four cases out of the many I have done. The models taken before and after treatment are before you.

CASE 1.—A powerful man, aged 19 years, was admitted to the Leeds Infirmary on May 11th, 1892, suffering from compound fracture of the lower jaw, and on May 19th I was asked to see the case. I found the lower maxilla fractured transversely across the ramus on the patient's left side, also

perpendicularly between the two fangs of the first molar on the same side and likewise perpendicularly through the socket of the second bicuspid on the patient's right. The front portion was much displaced, being deeply depressed and exposing the second fang of the molar in its full length. The front portion was also considerably overlapping the posterior part, carrying the median line of the maxilla considerably over to the patient's left side. On May 20th I drilled holes through the jaw and wired in the manner described. There were no complications and on June 11th the teeth were all well opposed to each other and on July 7th I removed the suture and found all firm.²

[Details of two other cases were then given.]

CASE 4.—The patient was a canal boatman who during the early morning of Dec. 28th, 1896, was winding a lock windlass when his foot slipped on a piece of ice and the revolving handle struck him across the jaw, causing a double fracture of the inferior maxilla and more or less concussion of the brain. I found the jaw fractured through its body between the second bicuspid and first molar teeth on the left side, and between the first and second bicuspids on the right side. The anterior portion was much depressed, and although there was no external wound there was considerable swelling. On the 30th he was anaesthetised and I wire-sutured the parts together. On March 15th, 1897, I tightened the sutures and on May 7th I removed them. The fractured portions of the jaw were perfectly united and there was complete antagonism between the upper and lower dentures.

For suturing purposes I have always used annealed silver-plated copper wire, and that it is preferable to solid silver will be best illustrated by the following two cases and by the expert evidence which Professor John Goodman, M.I.C.E., of the Yorkshire College, has so kindly given.

I was asked to see two cases of fractured maxillæ admitted to the Leeds Infirmary on Feb. 9th and Feb. 20th last. The messages arrived, however, after I had left Leeds, and my method of wiring was adopted in both cases, the drilling being done by the electro-motor. Solid silver wire was used, however, and it broke on twisting. In the other case it broke three times during the twisting stage. Thinking it important for surgical work generally that it should be determined which kind of wire was the stronger and more ductile I brought the matter before Professor Goodman, whose tests proved as follows—that the number of twists per inch in length which annealed silver-plated copper wire would bear before fracture, was 22·8, as compared with 18 only in solid silver wire. When not annealed the difference was 13·7 as compared with 12·8. This proves that annealing greatly increases the ductility of wire. Testing the wires in pure tension it was found that the breaking load of copper as compared with silver was 47 pounds as compared with 42. The detailed results are as follows. Silver-plated copper wire: diameter, 0·041 inch; sectional area, 0·00132 square inch; breaking load, 47 pounds; breaking stress in pounds per square inch, 35,600; extension per cent. on three inches before fracture, 41·0 per cent. Silver wire: diameter, 0·040 inch; sectional area, 0·00126 square inch; breaking load, 42 pounds; breaking stress in pounds per square inch, 33,300; extension per cent. on three inches before fracture, 33·0 per cent.

From all this you will note that copper wire is both stronger and more ductile than silver. Also Professor Goodman states that if annealed copper wire be used it should, in his opinion, be annealed before plating, as a very slight amount of overheating causes the silver to scale off. For this reason, therefore, and in order to simplify matters, I have arranged with Messrs. S. Maw, Son, and Thompson to supply wire already annealed. Having wired the bones there are just two or three matters to see to. As nearly all cases of fractured jaws are compound, there is liability to sepsis and to obviate this the wound should be well irrigated and various forms of antiseptics used. It is also well to dust the wound with equal parts of iodoform and boric acid. Perfect rest must for a time be given by not allowing conversation which, as a muscular effort, disturbs the part in the early stages, and mastication must not be allowed for some weeks. Nourishment should be given in liquid form and this may well be done by fixing an indiarubber tube to the spout of a feeding-cup and then passing the tube into the mouth through the space left by the loss of a tooth. In these days of tooth degeneration we rarely find a set complete, but in

² THE LANCET, Dec. 3rd, 1892, p. 1256.

the improbable event of there being no such space the tube may be passed round the back of the last molar.

In concluding my paper I cannot do better than finish by stating that, judging from the long experience which I have had in the treatment of fractured maxillæ where there is displacement, the opinion I have come to is that for neatness, cleanliness, simplicity, and good results there is no better method than by wire suture. There is a claim on it, also, from a hospital point of view, as after, say, the second day, except in case of other injuries received, the patient is discharged as an in-patient. Also I believe that for surgical purposes there is a great future for the electro-motor, and that it will ultimately become an essential and invaluable aid in all complicated forms of bone-work.

It has often struck me in watching operations daily performed at the Leeds Infirmary that to open the mastoid cells by means of chisel and hammer, remove exostoses by aid of a gouge, trephine the skull by hand, drill holes through bone with gimlet or Archimedean drill, that the muscular effort required lessens the delicacy of touch so conducive to advanced work. Also in aural cases may not some cerebral irritation be induced? At present the use of the motor is limited, but there will be no difficulty in making it work perfectly an ordinary saw, drill, trephine, automatic chisel, and do any form of bone-work. In cases where electric power is not to be had either accumulated or otherwise, a spring motor might be made which would be of great service to our army surgeons in time of war. For it is important that advances made which benefit the patients in hospital should also be arranged to enable others not so situated to receive the same measure of benefit. I would suggest that the instrument be arranged to shut down into smaller space so as to be more portable. There should also be disconnecting gear in the handpiece so that if the operator lessens his grip the cutting instrument should immediately cease working, in the same way that you can by releasing a spring in the receiver of a telephone place it out of use. Of course, we must not expect that for philanthropic reasons alone electricians will bring about these changes. It will be a question of demand and supply, so that the producer may reap benefit from his efforts. We may rest assured, however, that in these days of scientific advancement our surgeons will not fail to take up anything which will better enable them to benefit their patients. In this way the demand will rise, and I fully believe that the time is not far distant when the surroundings of every surgeon will not be considered complete without an electro-motor.

Leeds.

Clinical Notes :

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

PYO-PNEUMOTHORAX DUE TO EMPYEMA PERFORATING THE LUNG; RECOVERY.

By F. PERCY ELLIOTT, M.B., C.M. ABERD.

THE following case deserves to be recorded. The patient, who was a monthly nurse, aged 44 years, had up to this period of her life always enjoyed good health, having had nothing wrong with her beyond the usual ailments of childhood. She had never had bronchitis nor had she ever suffered from any chest affection previously. On her side of the family there had been no tendency to lung trouble. Her husband died from phthisis about three years before her illness and she carried out the duties of nurse, not only occupying the same room, but constantly sleeping with him down to nearly the end of his life. She had four children, all of whom exhibited a strumous taint. On Nov. 12th, 1894, while following her occupation, she suddenly experienced a sharp pain in the right breast which "caught" her on breathing. This was the first thing that led her to believe that something was wrong with her. She had neither any rigors nor any sensation of chilliness. In consequence of increasing pain she was forced to take to her bed. She at that time complained of pain in, and just below, the right breast, aggravated

by deep breathing, dyspnoea, and slight cough. On palpation tactile fremitus was found diminished on the right side and percussion elicited a dull note at the base of the chest on the same side; auscultation revealed deficient breath-sounds, diminished vocal resonance, and a slight friction sound. Her temperature was 101° F. and her pulse was 100. These signs were taken to mean pleurisy with effusion. A couple of days later the effusion became very marked, respiration being much more distressing. Towards the end of the first week of the illness the fluid occupied about two-thirds of the pleural cavity and the temperature took on a hectic character. There was much sweating and the face assumed a very sallow colour, all the symptoms now pointing to empyema. At this stage the patient complained of an unpleasant taste, especially after coughing. It was decided to aspirate the chest, but before this could be done there occurred a violent fit of coughing and she expectorated about three pints of purulent material of a greenish-yellow colour, this being freely mixed with blood towards the end of the attack of coughing. The next examination of the chest showed the presence of air and fluid. The expectoration continued of the same character but gradually diminished in quantity till at the end of seven weeks from the commencement of the illness it had completely stopped, together with the cough. Pain was only felt on deep breathing. In less than three months from the date of her first symptom the patient was able to resume and carry on her duties satisfactorily. Two and a half years after this illness I took an opportunity of making a physical examination. There was no deformity resulting from her illness to be seen; the right shoulder drooped slightly, but not more than is usually met with in the majority of individuals. The breath-sounds were strong and movement on the right side of the chest was as good as on the opposite side. The only remaining trace of this illness was a slight friction sound on very deep inspiration. The woman expressed herself as feeling in excellent health and looked it.

Two points in connexion with this case seemed especially interesting—viz., the short time in which the effusion became purulent, there having been no antecedent illness, and also the quick recovery from the immediate as well as from the remote effects of a pyo-pneumothorax. With regard to treatment the measures employed were nothing out of the common. While expectoration lasted the patient frequently inhaled the vapour from a mixture of eucalyptus and thymol, the rest of the treatment consisting of a liberal diet with tonics.

Walthamstow.

NOTE ON A CASE OF COCCYODYNIA; REMOVAL OF THE COCCYX; RECOVERY.

By MONTAGUE D. MAKUNA, M.R.C.S. ENG.,
L.R.C.P. LOND.

AS cases of coccydynia are infrequent and the pathology and treatment of that disease are still *sub judice*, I might be permitted to record a case of complete recovery by the removal of the coccyx.

A lad, aged eight years, came under observation during the first week in March, 1900, suffering from severe pain over the sacral region which deprived him of sleep and from inability to assume a sitting posture. This was associated with loss of body-weight and anorexia. On examination it was found that the coccyx was pointing backwards and downwards, its end touching a seat, so as to render a sitting position painful by the pressure of the soft parts and the skin between its point and the seat. On rectal examination it was discovered that the two lower segments of the sacrum were tilted inwards and that the continuity of the sacral curve was lost. This projection on the anterior surface of the sacrum could not be reduced under pressure, as what might be called the fractured surfaces were firmly but irregularly united. There was no clear history of injury and it is questionable whether this deformity in the sacrum was due to malformation or malnutrition. No operative procedure could be undertaken to reduce the deformity without doing considerable injury to the sacral nerves. While it was necessary that the coccyx should be removed to allow the lad to sit comfortably, I was in considerable doubt whether it would relieve him of his sufferings. He was kept in a recumbent